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31. (Amended) The sensor element as recited in claim 24, wherein the pump cell includes an inner pump electrode arranged in the measuring gas chamber opposite to the measuring electrode.

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43. (Amended) A method for manufacturing a sensor element for determining a concentration of gas components in gas mixtures, comprising:

providing a solid electrolyte foil; and

applying a solid electrolyte layer to the solid electrolyte foil by screen-printing a pasty ceramic material, the solid electrolyte layer being applied to include a measuring gas chamber and a reference gas channel.

## REMARKS

Claims 24 to 47 are now pending.

Applicants respectfully request reconsideration of the present application in view of this amendment.

Applicants note with appreciation the acknowledgment of the claim for foreign priority and the indication that certified copies of the priority documents have been received.

Applicants thank the Examiner for considering the Information Disclosure Statement, PTO 1449 Form and disclosed references.

With respect to claims 24 to 47 being rejected as non-enabling under the first paragraph of 35 U.S.C. § 112, the rejection is not understood. In any event, the specification plainly provides that "[t]he measuring gas chamber and the reference channel ... are separated from each other by a partition, which is produced by applying a ceramic paste to an adjacent, solid electrolyte foil." (Abstract, lines 9 to 14). In this regard, the present application also provides, for example, that:

> Figures 1 and 2 show a basic design of a first example embodiment according to the present invention. As shown, a planar sensor element 10 of an electrochemical gas sensor has a plurality of solid electrolyte layers, for example, 11a, 11b, 11c, and 11d, that conduct oxygen ions. In this context, solid electrolyte layers 11a, 11c, and 11d are designed as ceramic foils, and form a planar ceramic body. They are made of a solid electrolyte material that conducts oxygen ions, such as $ZrO_2$ stabilized or partially stabilized by $Y_2O_3$.
>
> In contrast, solid electrolyte layer 11b is produced *by screen-printing a pasty ceramic material, e.g., on solid*

> *electrolyte layer 11a. The solid electrolyte material used as a ceramic component of the pasty material may be the same as the one which makes up solid electrolyte layers 11a, 11c, and 11d.*
>
> The integrated form of the planar ceramic body of sensor element 10 is produced *in a conventional manner*, by laminating together the ceramic foils printed over with solid electrolyte layer 11b and functional layers, and by subsequently sintering the laminated structure.

(Specification, page 4, lines 13 to 34) (emphasis added). As regards the measuring and reference chambers and partition, the present application further provides, for example, that:

> Sensor element 10 contains two gas chambers, a measuring gas chamber 13 and a reference gas channel 15. These are situated in the same layer plane, e.g., 11b, and separated from each other in a gas-tight manner, by a partition 12. Reference gas channel 15 is put in contact with a reference gas atmosphere, by a gas intake 17 whose one end leads out of the planar body of sensor element 10. It has an end 16 on the side of the measuring gas chamber, and an end 18 on the side of the gas intake. Supporting elements 28 are integrated in the middle of reference gas channel 15, along a longitudinal axis of the sensor element. These permit the reference gas channel to have a wide design, without decreasing the rigidity of the sensor element. As an alternative, the reference gas channel can also be at least partially filled in with a porous ceramic material.
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> ...
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> As discussed above, the problem with this overall arrangement is that the parallel arrangement of the gas chambers markedly increases the internal resistance of the concentration cell. This is caused by the longer path that the charge carriers must cover inside the solid electrolyte. *For this reason, measuring and reference electrodes 21, 22 are spatially arranged to be as close as possible to each other. This is primarily rendered possible by the screen-printing technique used in manufacturing the sensor element, since, in this manner, partition 12 can be designed to be very thin. The relatively short distance of the two electrodes from each other results in an internal resistance of the concentration cell which is only slightly greater than conventional sensors, and can be used to regulate the temperature of the sensor element.*

(Specification, page 4, line 36 to page 5, line 13, and page 7, line 19 to 33) (emphasis added). The present application further provides, for example, that:

> *The effect of adapting the partition situated between the measuring gas chamber and the reference gas channel on the geometry of the measuring electrode situated in the measuring gas chamber, is such that only a small clearance exists between the measuring gas chamber and the reference gas channel.* Therefore, and therefore, the internal resistance of the sensor-element concentration cell is decreased. Furthermore, it is advantageous to design the reference electrode located in the reference gas channel in such a manner that it adapts to the geometry of the partion [sic] between the measuring gas chamber and the reference gas channel. Also the surface of the reference electrode facing in the direction of the partition is as large as possible. This permits a uniform loading of the entire electrode surface, and decreases the electrical resistance of the concentration cell that is made of the measuring electrode and the reference electrode. This is achieved in an advantageous manner when the measuring electrode is circular and the reference electrode is led around the measuring gas chamber, which is circular as well. In addition, the internal resistance of this sensor element's concentration cell exhibits an easily-evaluated temperature dependence, which can be used to control the temperature of the sensor element.

(Specification, page 2, line 27 to page 3, line 12) (emphasis added). As regards the diffusion barrier, the present application provides, for example, the following:

> A porous diffusion barrier 27 is arranged inside measuring gas chamber 13, in front of inner pump electrode 20 and measuring electrode 21, in the diffusion direction of the measuring gas. Porous diffusion barrier 27 constitutes a diffusion resistor with regard to the gas diffusing towards electrodes 20, 21. In the case of a reference gas channel 15 filled with a porous ceramic material, diffusion barrier 27 and the filling of reference gas channel 15 may be made of the same material, in order to efficiently manufacture them in one method step.

(Specification, page 6, lines 7 to 15). Additionally, the Examiner is further referred, for example, to Figures 1 through 6 which illustrate in detail the partition 12, the measuring gas chamber 13, the reference gas chamber 15, and diffusion barrier 27.

Hence, it is therefore respectfully submitted that the subject matter of the claims is described in the specification so as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the claimed subject matter.

Also in this regard, it is respectfully submitted that the Office Action's assertions and arguments simply do not reflect the standard for determining whether a patent application complies with the enablement requirement. (See M.P.E.P. § 2164). The Supreme Court established the appropriate standard as whether the experimentation for practicing the invention was undue or unreasonable. (See M.P.E.P. § 2164.01 (citing Mineral Separation v. Hyde, 242 U.S. 261, 270 (1916); In re Wands, 858 F.2d 731, 737, 8 U.S.P.Q.2d 1400, 1404 (Fed Cir. 1988))). Thus, the enablement test is "whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation." (See id. (citing United States v. Teletronics, Inc., 857 F.2d 778, 785, 8 U.S.P.Q.2d 1217, 1223 (Fed. Cir. 1988))).

The Federal Circuit has made clear that there are many factors to be considered in determining whether a specification satisfies the enablement requirement, and that these factors include but are not limited to the following: the breadth of the claims; the nature of the invention; the state of the prior art; the level of ordinary skill; the level of predictability in the art; the amount of direction provided by the inventor; the existence of working examples; and the quantity of experimentation needed to make or use the invention based on the disclosure. (See id. (citing In re Wands, 858 F.2d at 737, 8 U.S.P.Q.2d at 1404 and 1407)). In this regard, the Federal Circuit has also stated that it is "improper to conclude that a disclosure is not enabling based on an analysis of only one of the above factors," and that the examiner's analysis must therefore "consider all the evidence related to each of these factors" so that any nonenablement conclusion "must be based on the evidence as a whole." (See M.P.E.P. § 2164.01).

Also, an examiner bears the initial burden of establishing why the "scope of protection provided by a claim is not adequately enabled by the disclosure." (See id. (citing In re Wright, 999 F.2d 1557, 1562, 27 U.S.P.Q.2d 1510, 1513 (Fed. Cir. 1993))). Accordingly, a specification that teaches the manner and process of making and using an invention in terms that correspond in scope to those used in describing and defining the claimed subject matter complies with the enablement requirement. (See id.).

In contrast to the above, however, it is respectfully submitted that the Office Action's unsupported assertions do not adequately concern – as they must under the law -- whether the present application enables a person having ordinary skill in the art to practice the claimed invention without undue experimentation -- which it plainly does, as evidenced, for example, by the above citations to the present application. In short, the Office Action's assertions are merely conclusory and do not address the issue of whether one having ordinary skill would have to unduly experiment to practice the claimed invention -- a proposition for which the Office bears the burden of proving a prima facie case as to the rejected claims.

In this regard, to properly establish non-enablement, the Office must make use of proper evidence, sound scientific reasoning, and the established law. In the case of Ex Parte Reese, 40 U.S.P.Q.2d 1221 (Bd. Pat. App. & Int. 1996), a patent examiner rejected (under the first paragraph of section 112) application claims because they were based on an alleged non-enabling disclosure, and was promptly reversed because the rejection was based only on the examiner's subjective belief that the specification was not enabling as to the claims. In particular, the examiner's subjective belief was simply not supported by any "evidence or sound scientific reasoning" and therefore ignored recent case law -- which makes plain that an examiner (and not an applicant) bears the burden of persuasion on an enablement rejection.

More particularly, the examiner in Ex parte Reese was reversed because the rejection had only been based on a conclusory statement that the specification did not contain a sufficiently explicit disclosure to enable a person to practice the claimed invention without exercising undue experimentation -- which the Board found to be merely a conclusory statement that only reflected the subjective and unsupported beliefs of a particular examiner and that was not supported by any proper evidence, facts, or scientific reasoning. (See id.). Moreover, the Board made clear that it is "incumbent upon the Patent Office . . . to back up assertions of its own with acceptable evidence," and also made clear that "[where an] examiner's 'Response to Argument' is not supported by evidence, facts or sound scientific reasoning, [then an] examiner has not established a *prima facie* case of lack of enablement under 35 U.S.C. § 112, first paragraph." (See id. at 1222 & 1223; italics in original). In the present case, the Office Action has not even alleged in a conclusory way that undue experimentation would be required. Moreover, even as to the assertions as presented, the present application plainly discloses how to use the subject matter of the rejected claims, as explained above.

In view of all of the foregoing, it is believed and respectfully submitted that the Office Action's assertions to support the non-enablement rejection of the claims do not satisfy the

judicial standards discussed above with respect to the enablement requirement since the arguments and assertions presented do not relate the scope of the claims to the specification to determine whether the specification is enabling, nor do they properly address the enablement factors that under the law require consideration. It is therefore respectfully submitted that the Office Action has not even established a prima facie case of non-enablement.

It is therefore respectfully requested that the enablement rejections be withdrawn for the above reasons.

With regards to claim 45 and the Examiner's request for related discussion of the supporting element in the specification, the present application provides, for example, the following:

> The sensor element and method according to the present invention, respectively, have the advantage that the layer thickness of the layer containing both the measuring gas chamber and the reference gas channel can be varied. A layer that has a very low layer thickness, or a layer having very filagree-like boundaries of the gas chambers contained therein, and having *supporting elements* not connected to the boundaries may be attained.
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> ...
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> *Supporting elements* 28 are integrated in the middle of reference gas channel 15, along a longitudinal axis of the sensor element. These permit the reference gas channel to have a wide design, without decreasing the rigidity of the sensor element. As an alternative, the reference gas channel can also be at least partially filled in with a porous ceramic material.

(Specification, page 2, lines 18 to 25, and page 5, lines 6 to 13) (emphasis added). Accordingly, it is therefore requested that this rejection in connection with claim 45 be withdrawn.

Claims 24 to 47 stand rejected as indefinite under the second paragraph of 35 U.S.C. § 112.

As regards claims 24, 31, and 43, these claims have been rewritten to better clarify the subject matter of the claims. In view of this amendment, the definiteness rejection of these claims (and their dependent claims) should be withdrawn.

As regards the wording of claims 26 and 28 cited in the Office Action as "vague", it is respectfully submitted that the cited wording is definite and clear as used and as would be

understood when each of the rejected claims is read in view of the specification by one of ordinary skill in the art, which is the proper objective standard.

As regards the wording "a geometry of the partition is adapted to a reference-gas-side boundary of the measuring electrode" and "the reference electrode has a boundary on a side of the measuring gas chamber, the boundary being adapted to a shape of the reference-gas side of the partition" as recited by claims 26 and 28, the present application provides, for example, the following:

> *The effect of* ***adapting the partition*** *situated between the measuring gas chamber and the reference gas channel on the geometry of the measuring electrode situated in the measuring gas chamber, is such that only a small clearance exists between the measuring gas chamber and the reference gas channel.* Therefore, and therefore [sic], the internal resistance of the sensor-element concentration cell is decreased. Furthermore, *it is advantageous to design* ***the reference electrode*** *located in the reference gas channel in such a manner that* ***it adapts to the geometry of the partion*** *[sic] between the measuring gas chamber and the reference gas channel. Also the surface of the reference electrode facing in the direction of the partition is as large as possible.* This permits a uniform loading of the entire electrode surface, and decreases the electrical resistance of the concentration cell that is made of the measuring electrode and the reference electrode. This is achieved in an advantageous manner when the measuring electrode is circular and the reference electrode is led around the measuring gas chamber, which is circular as well. In addition, the internal resistance of this sensor element's concentration cell exhibits an easily-evaluated temperature dependence, which can be used to control the temperature of the sensor element.

(Specification, page 2, line 27 to page 3, line 12) (emphasis added). The present application further provides, for example, the following:

> The sharply one-sided loading of the measuring and reference electrodes, in comparison with conventional types of sensors having the gas chambers arranged one over another, represents an additional problem. Since the charge carriers inside the solid electrolyte prefer the shortest path between the two electrodes, the compartments of measuring and reference electrodes 21, 22 facing the other respective electrode are the most highly loaded. *This fact is particularly taken into account by* ***adapting the geometry of reference gas channel 15 and reference electrode 22.*** *Along these lines, reference electrode 22 is designed in such a manner that its top surface reaches its maximum dimension at the end of reference channel 15 on the side of the measuring gas, so that the center of mass of the electrode*

*surface is shifted as closely as possible to the center point of measuring electrode 21.*

(Specification, page 7, line 35 to page 8, line 12) (emphasis added). The Examiner is further referred, for example, to Figures 1 through 6 which illustrate in detail the partition 12, the measuring electrode 21, and the reference electrode 22.

It is respectfully submitted that the wording of claims 26 and 28 is therefore definite to a person having ordinary skill in the art, in view of the foregoing, as well as the remainder of the specification.

As regards claim 45, it is respectfully submitted that claim 45 is definite as presented for essentially the same reasons explained above, in which the specification was cited as plainly providing support for at least one supporting element being produced in the reference gas channel using the solid electrolyte layer. It is therefore respectfully requested that the definiteness rejection of claim 45 be withdrawn.

In view of the above, it is respectfully submitted that the presently pending claims comply with the second paragraph of § 112 since a person having ordinary skill in the art would understand what is claimed when the claim is read in view of the specification. See Miles Labs., Inc. v. Shandon, Inc., 997 F.2d 870, 27 U.S.P.Q.2d 123 (Fed. Cir. 1993). In this regard, it is also noted that terms in a claim are to be understood in view of the specification. (See *In re Weiss*, 26 U.S.P.Q.2d 1885, 1887 (Fed. Cir. 1993) (when interpreting a claim term or phrase, one must "look to the specification for the meaning ascribed to that term"; Board reversed) (unpublished decision); *In re Okuzawa*, 190 U.S.P.Q. 464, 466 (C.C.P.A. 1976) ("claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification"; Board reversed; emphasis in original) (citing *In re Royka*, 180 U.S.P.Q. 580, 582-83 (C.C.P.A. 1974) (claims are "not to be read in a vacuum" and "their terms still have to be given the meaning called for by the specification of which they form a part"; Board reversed; emphasis in original); and *In re Rohrbacher*, 128 U.S.P.Q. 117, 119 (C.C.P.A. 1960) (an "applicant is his own lexicographer and words used in his claims are to be interpreted in the sense in which they are used in the specification"; Board reversed)).

Claims 24 to 28, 33 to 35, 37, 40, 41, and 43 to 47 stand rejected under 35 U.S.C. § 102(b) as anticipated by Friese et al., United States Patent No. 5,314,604 ("the Friese reference").

The Friese reference purportedly concerns a sensor element for broad band sensors to determine the lambda value of gas mixtures, in which the sensor element includes a punched-out central measuring gas supply opening 5, a pair of interior pump electrodes 8, 8' arranged

annularly about the measuring gas supply opening 5 on both sides of a diffusion gap 7, an exhaust gas electrode 9 arranged in the diffusion gap 7 downstream from the interior pump electrodes 8,8', and an air reference electrode 11 arranged in an air reference channel 10, the exhaust gas electrode 9 and the air reference electrode 11 forming a Nernst cell. (See Friese, Abstract, Figure 1A and related text). Due to this particular arrangement of the exhaust gas electrode 9, the pump cell formed by the interior pump electrodes 8,8' is purportedly protected from overload, and falsification of the sensor signal is prevented. (See Friese, Abstract, Figure 1A and related text). As stated in the Friese reference, "[t]he essential characteristic of the sensor element ... is the arrangement of a Nernst electrode in the diffusion gap and downstream of a dual pump electrode on both sides of the diffusion gap." (Friese reference, col. 2, lines 25 to 29).

It is respectfully submitted that the Friese reference does not identically describe a sensor element as recited in claims 24 and 43. In particular, the Friese reference does not identically disclose a measuring gas chamber and a reference gas chamber situated in a same layer plane and a partition arranged between them having a base formed from a ceramic paste applied to an adjacent solid electrolyte foil as recited in claim 24, or a solid electrolyte layer being applied to a solid electrolyte foil to include a measuring gas chamber and a reference gas chamber by screen-printing a pasty ceramic material as recited in claim 43. While the Office Action asserts that the "measuring gas chamber with an inner pump electrode 8-8' can also be considered to be in the solid electrolyte 2 because the measuring gas chamber appears to be partly in the electrolyte [and] [t]herefore, the measuring gas chamber and the reference gas channel are in the 'same layer plane'," it is believed that any review of the Friese reference plainly reveals that such a measuring gas chamber formed by the diffusion channel is situated above the solid electrolyte sheet 2 and not formed by screen-printing a pasty ceramic material. Moreover, the Office Action's assertion that "[a]t col.4, lines 15-20, the [Friese] patent states that the solid electrolyte sheets can be formed by screen printing" is unsupported since it is only disclosed in the cited passage that individual sheets may be **joined** by a method that is customarily used in screen printing (i.e, by so called laminating) so that while the sheets themselves may have layers printed on them using screen technology, by no means can it be gathered from the cited passage that the sheets themselves are formed using screen-printing technology. Accordingly, since the features of claims 24 and 43 are plainly not identically described -- as they must be for anticipation -- by the Friese reference, it is respectfully submitted that claims 24 and 43 are not anticipated and are therefore allowable.

Claims 25 to 28, 33 to 35, 37, 40, and 41 ultimately depend from claim 24, and are therefore allowable for at least the same reasons that claim 24 is allowable.

Claims 44 to 47 depend from claim 43, and are therefore allowable for at least the same reasons that claim 43 is allowable.

Claims 24 to 28, 33 to 35, 37, 40 and 43 to 47 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Friese in view of Schneider et al., United States Patent No. 5,529,677 ("the Schneider reference"), Jach et al., United States Patent No. 6,375,816 ("the Jach reference"), or Logothetis et al., United State Patent No. 4,487,680 ("the Logothetis reference").

With respect to the Jach reference, Applicants have claimed priority under 35 U.S.C. § 119 to German Patent Application No. 199 41 051.8, which was filed on August 28, 1999, and for which the Examiner has acknowledged the § 119 priority claim in the Office Action. To establish that the rejected claims are entitled to the foreign priority date of August 28, 1999 -- which precedes the December 14, 1999, filing date of the Jach reference, an Affidavit certifying the earlier filed English translation of German Patent Application No. 199 41 051.8 (on which foreign priority is based) is submitted with this response. In view of this certification of the earlier filed English translation, which plainly establishes the foreign priority date of August 28, 1999, Applicants respectfully request withdrawal of the Jach reference as to the rejected claims under 35 U.S.C. § 103. (See M.P.E.P. § 201.15).

As regards the Schneider reference, it purportedly concerns a planar polarographic sensor in which a "Nernst cell N is made of a thin solid electrolyte sheet 40, a measuring electrode 41, a reference electrode 42, and *a further* thin solid electrolyte sheet 44 having a reference channel 45 and reference gap 46." (Schneider, col. 3, lines 36 to 40, Figures 4 and 5) (emphasis added). As such, the reference channel 45 and reference gap 46 are arranged in their own single layer plane, separate from the other sensor elements, and therefore the Schneider reference does not disclose a measuring gas chamber and a reference gas chamber being situated in a same layer plane and a partition arranged between them having a base formed from a ceramic paste applied to an adjacent solid electrolyte foil as recited in claim 24, or a solid electrolyte layer being applied to a solid electrolyte foil to include a measuring gas chamber and a reference gas chamber by screen-printing a pasty ceramic material as recited in claim 43.

As regards the Logothetis reference, it purportedly concerns a planar oxygen pumping device that eliminates the need for a cavity or enclosed volume to communicate with the

outside volume through one or more apertures. (See Logothetis, col. 2, lines 28 to 36; col 1, lines 62 to 64). As such, the planar oxygen pumping device has no comparable measuring gas chamber and therefore the Logothetis reference does not disclose a measuring gas chamber and a reference gas chamber being situated in a same layer plane and a partition arranged between them having a base formed from a ceramic paste applied to an adjacent solid electrolyte foil as recited in claim 24, or a solid electrolyte layer being applied to a solid electrolyte foil to include a measuring gas chamber and a reference gas chamber by screen-printing a pasty ceramic material as recited in claim 43.

Accordingly, it is respectfully submitted that even if it were proper to combine the references as suggested (which is not conceded), the secondary Schneider and Logothetis references do not cure the deficiencies of the Friese reference (as explained above) with respect to claims 24 to 28, 33 to 35, 37, 40, 41, and 43 to 47. Indeed, the Office Action does not allege that they do. It is therefore respectfully submitted that these claims are allowable for at least the same reasons as stated earlier in connection with the anticipation rejection. Accordingly, the rejection of these claims under 35 U.S.C. § 103(a) should be withdrawn.

With further respect to the references relied upon and in view of the foregoing discussion of what those references purport to show, it is respectfully submitted that the Office Action does not establish a prima facie obviousness case at least because there is no suggestion or motivation in the references relied upon to combine or modify them as suggested by the Examiner. The case law and M.P.E.P. § 2143.01 make clear that a statement that combining or modifying the references would have been within the ordinary skill of the art at the time the claimed invention was made does not establish a prima facie obviousness case without supporting objective reasons to combine or modify the references. It is therefore respectfully submitted that this rejection of claims 24 to 28, 33 to 35, 37, 40, 41, and 43 to 47 under 35 U.S.C. § 103(a) should be withdrawn for these further reasons.

With regard to the rejection of claim 31 under 35 U.S.C. § 103(a) as unpatentable over Friese in view of European Patent No. 678740 ("the EP678740 reference") or Nakae et al., United States Patent No. 5,298,147 ("the Nakae reference") with or without the Schneider, Jach, and Logothetis references, it is respectfully submitted that even if it were proper to combine the references as suggested (which is not conceded), it is respectfully submitted that the secondary EP678740 and Nakae references do not cure the critical deficiencies of the Friese, Schneider, Jach, and Logothetis references (as explained above) with respect to claim 24, from which claim 31 depends. Indeed, the Office Action does not assert that they do. It

is therefore respectfully submitted that claim 31 is allowable for the same reasons as claim 24, and therefore the obviousness rejection of claim 31 should be withdrawn.

With regard to the rejection of claim 32 under 35 U.S.C. § 103(a) as unpatentable over Friese in view of Kato et al., United States Patent No. 6,059,947 ("the Kato reference") with or without the Schneider, Jach, and Logothetis references, it is respectfully submitted that even if it were proper to combine the references as suggested (which is not conceded), it is respectfully submitted that the secondary Kato reference does not cure the critical deficiencies of the Friese, Schneider, Jach, and Logothetis references (as explained above) with respect to claim 24, from which claim 32 depends. Indeed, the Office Action does not assert that it does. It is therefore respectfully submitted that claim 32 is allowable for the same reasons as claim 24, and therefore the obviousness rejection of claim 32 should be withdrawn.

With regard to the rejection of claim 36 under 35 U.S.C. § 103(a) as unpatentable over Friese in view of Makino et al., United States Patent No. 5,676,811 ("the Makino reference") with or without the Schneider, Jach, and Logothetis references, it is respectfully submitted that even if it were proper to combine the references as suggested (which is not conceded), it is respectfully submitted that the secondary Makino reference does not cure the critical deficiencies of the Friese, Schneider, Jach, and Logothetis references (as explained above) with respect to claim 24, from which claim 36 depends. Indeed, the Office Action does not assert that it does. It is therefore respectfully submitted that claim 36 is allowable for the same reasons as claim 24, and therefore the obviousness rejection of claim 36 should be withdrawn.

With regard to the rejection of claims 38 and 39 under 35 U.S.C. § 103(a) as unpatentable over Friese in view of Sasayama et al., United States Patent No. 4,900,425 ("the Sasayama reference") with or without the Schneider, Jach, and Logothetis references, it is respectfully submitted that even if it were proper to combine the references as suggested (which is not conceded), it is respectfully submitted that the secondary Sasayama reference does not cure the critical deficiencies of the Friese, Schneider, Jach, and Logothetis references (as explained above) with respect to claim 24, from which claims 38 and 39 depend. Indeed, the Office Action does not assert that it does. It is therefore respectfully submitted that claims 38 and 39 allowable for the same reasons as claim 24, and therefore the obviousness rejection of claims 38 and 39 should be withdrawn.

With regard to the rejection of claim 42 under 35 U.S.C. § 103(a) as unpatentable over Friese in view of Yamada et al., United States Patent No. 4,505,807 ("the Yamada reference")

with or without the Schneider, Jach, and Logothetis references, it is respectfully submitted that even if it were proper to combine the references as suggested (which is not conceded), it is respectfully submitted that the secondary Yamada reference does not cure the critical deficiencies of the Friese, Schneider, Jach, and Logothetis references (as explained above) with respect to claim 24, from which claim 42 depends. Indeed, the Office Action does not assert that it does. It is therefore respectfully submitted that claim 42 is allowable for the same reasons as claim 24, and therefore the obviousness rejection of claim 42 should be withdrawn.

With regard to the rejection of claim 45 under 35 U.S.C. § 103(a) as unpatentable over Friese in view of Holfelder et al., United States Patent No. 4,502,939 ("the Holfelder reference") or Mase et al., United States Patent No. 5,298,147 ("the Mase reference") with or without the Schneider, Jach, and Logothetis references, it is respectfully submitted that even if it were proper to combine the references as suggested (which is not conceded), it is respectfully submitted that the secondary Holfelder and Mase references do not cure the critical deficiencies of the Friese, Schneider, Jach, and Logothetis references (as explained above) with respect to claim 43, from which claim 45 depends. Indeed, the Office Action does not assert that they do. It is therefore respectfully submitted that claim 45 is allowable for the same reasons as claim 43, and therefore the obviousness rejection of claim 45 should be withdrawn.

With regard to the rejection of claims 24 to 26, 28, 31, 33, 41 to 44, 46 and 47 under 35 U.S.C. § 103(a) as unpatentable over EP678740 in view of the Schneider, Jach, or Logothetis references, or the rejection of claims 27, 34, 35, and 37 under 35 U.S.C. § 103(a) as unpatentable over EP678740 in view of the Schneider, Jach, or Logothetis and Friese references, or the rejection of claim 36 under 35 U.S.C. § 103(a) as unpatentable over EP678740 in view of the Schneider, Jach, or Logothetis and Makino references, or the rejection of claims 38 and 39 under 35 U.S.C. § 103(a) as unpatentable over the Friese reference in view of the Schneider, Jach, or Logothetis and Sasayama references, or the rejection of claims 40 and 45 under 35 U.S.C. § 103(a) as unpatentable over the EP678740 reference in view of the Schneider, Jach, or Logothetis and Holfelder references, it is respectfully submitted that the Office Action does not establish a prima facie obviousness case at least because there is no suggestion or motivation in the references relied upon to combine or modify them as suggested by the Examiner. The case law and M.P.E.P. § 2143.01 make clear that a statement that combining or modifying the references would have been within the ordinary skill of the art at the time the claimed invention was made does not

establish a prima facie obviousness case without supporting objective reasons to combine or modify the references.

In this regard, it is respectfully submitted that the Office Action's asserted suggestion to combine the secondary references is plainly based on nothing more than hindsight reasoning. In this regard, in rejecting a claim under 35 U.S.C. § 103, Applicant's invention "must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time." Interconnect Planning Corp v. Feil, 774 F.2d 1132, 1138, 227 U.S.P.Q. 543, 547 (Fed. Cir. 1985) (emphasis added). Indeed, the Office Action does not even assert that it would have been obvious at the time the invention was made to make such a combination. Accordingly, combining these prior art references without evidence of a proper suggestion, teaching, or motivation "simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight." In re Dembiczak, 50 U.S.P.Q.2d 1614, 1617 (CA FC 1999).

Morever, the cases of In re Fine, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988), and In re Jones, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992), make plain that a subjective "obvious to try" standard is not proper. In particular, the Court in the case of In re Fine stated that:

> Instead, the Examiner relies on hindsight in reaching his obviousness determination. . . . **One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.**

In re Fine, 5 U.S.P.Q.2d at 1600 (citations omitted; emphasis added). Likewise, the Court in the case of In re Jones stated that:

> Conspicuously missing from this record is any evidence, other than the PTO's speculation (if it be called evidence) that one of ordinary skill . . . would have been motivated to make the modifications . . . necessary to arrive at the claimed [invention].

In re Jones, 21 U.S.P.Q.2d at 1943 & 1944 (citations omitted). In short, there must be evidence of why a person having ordinary skill in the art would be motivated to modify a reference to provide the claimed subject matter of the claims. Unsupported assertions are not evidence as to why a person having ordinary skill in the art would be motivated to modify the reference to provide the claimed subject matter of the claims to address the problems met thereby. Accordingly, to the extent that the Examiner maintains unsupported assertions -- statements that are apparently within the personal knowledge of the Examiner, it is respectfully requested pursuant to 37 C.F.R. § 1.104(d)(2) that the Examiner should provide

an affidavit and/or published information concerning these assertions. This is because many of the rejections are apparently based on assertions that draw on facts within the personal knowledge of the Examiner, since no real support has been provided for these otherwise conclusory assertions.

It is therefore respectfully submitted that claims 24 to 26, 28, 31, 33, 41 to 44, 46, and 47 rejected as obvious are allowable for the above reasons over the reference relied upon, and the obviousness rejections of these claims should therefore be withdrawn.

With respect to the Examiner's remarks on page 11 of the Office Action objecting to the wording of the Specification, pages 2 and 3 of the Specification have been amended to address the alleged informalities. Approval of the changes is respectfully requested.

## CONCLUSION

In view of all of the above, it is believed that the rejections have been obviated, and that claims 24 to 47 are allowable. It is therefore respectfully requested that the rejections be withdrawn, and that the present application issue as early as possible.

Respectfully submitted,

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Dated: 7/28/03

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## AMENDMENT VERSION WITH MARKINGS

**IN THE SPECIFICATION:**

The paragraph beginning on page 2, line 27, has been amended as follows:

--The effect of adapting the partition situated between the measuring gas chamber and the reference gas channel on the geometry of the measuring electrode situated in the measuring gas chamber, is such that only a small clearance exists between the measuring gas chamber and the reference gas channel. Therefore, [and therefore,] the internal resistance of the sensor-element concentration cell is decreased. Furthermore, it is advantageous to design the reference electrode, located in the reference gas channel, in such a manner that it adapts to the geometry of the [partion] partition between the measuring gas chamber and the reference gas channel. Also the surface of the reference electrode facing in the direction of the partition is as large as possible. This permits a uniform loading of the entire electrode surface, and decreases the electrical resistance of the concentration cell that is made of the measuring electrode and the reference electrode. This is achieved in an advantageous manner when the measuring electrode is circular and the reference electrode is led around the measuring gas chamber, which is circular as well. In addition, the internal resistance of this sensor element's concentration cell exhibits an easily-evaluated temperature dependence, which can be used to control the temperature of the sensor element.--.

The paragraph beginning on page 3, line 14, has been amended as follows:

--In another exemplary embodiment, the measuring and pump electrodes, which are usually arranged separately in the measuring gas chamber, are advantageously [in] combined into one electrode. This allows one layer plane to be dispensed with, and further simplifies the sensor design.--.

## AMENDMENT VERSION WITH MARKINGS

**IN THE CLAIMS:**

Without prejudice, please amend the claims as follows:

24. (Amended) A sensor element for determining a concentration of gas components in gas mixtures, comprising:

a measuring gas chamber;

at least one pump cell which pumps oxygen at least one of into and out of the measuring gas chamber;

at least one concentration cell including at least one reference electrode and a measuring electrode, the at least one reference electrode interacting with the measuring electrode, the measuring gas chamber and the reference gas channel being situated in a same layer plane;

a reference gas channel, the at least one reference electrode being arranged in the reference gas channel, the reference gas channel providing the at least one reference electrode contact with a reference gas intake; and

a partition arranged between the measuring gas chamber and the reference gas channel, the partition having a measuring-gas side and a reference-gas side, the partition including a base, the base [being] formed from a ceramic paste applied to an adjacent solid electrolyte foil.

31. (Amended) The sensor element as recited in claim 24, wherein the pump cell includes an inner pump electrode[, the pump electrode being] arranged in the measuring gas chamber opposite to the measuring electrode.

43. (Amended) A method for manufacturing a sensor element for determining a concentration of gas components in gas mixtures, comprising:

providing a solid electrolyte foil; and

applying a solid electrolyte layer to the solid electrolyte foil by screen-printing a pasty ceramic material, the solid electrolyte layer [including] being applied to include a measuring gas chamber and a reference gas channel.